CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION

ORDER NO. 88-171
NPDES NO. CA 0028851

WASTE DISCHARGE REQUIREMENTS FOR:

APPLIED MATERIALS, INC.
3050 BOWERS AVENUE FACILITY
CITY OF SANTA CLARA, SANTA CLARA COUNTY

The California Regional Water Quality Control Board, San Francisco Bay Region (hereinafter called the Board), finds that:

1. Applied Materials, hereinafter called the discharger, operates a manufacturing facility for chemical vapor deposition equipment used in the semiconductor industry. The nine-acre site is located at 3050 Bowers Avenue in the City of Santa Clara, Santa Clara County.

2. The discharger, by application dated February 8, 1985 applied for issuance of waste discharge requirements and a permit to discharge waste under the National Pollutant Discharge Elimination System (NPDES). On June 19, 1985, the Board adopted Order No. 85-70 for the purpose of establishing waste discharge requirements and issued NPDES permit number CA 0028851 for the discharge of treated extracted groundwater.

3. Subsurface investigations initiated in November 1983 discovered volatile organic chemicals in both soils and groundwater at the site. The pollution appears to be the result of leakage and/or spillage associated with the operation of several underground tanks at the facility which has been used for manufacturing since 1970.

4. The discharger has completed additional investigation to delineate the extent of the groundwater pollution. The predominant pollutant in 1983 was trichloroethane at concentrations up to 6,700 parts per billion (ppb); lower concentrations of other chlorinated hydrocarbon compounds have been detected, including trichloroethylene, dichloroethylene, dichloroethane, and Freon 113. The pollutant plume in 1983 had migrated a distance of 700 feet or more from the source area to the northeast, and vertically downward to a depth of about 50 feet below the surface.

5. By letter dated October 10, 1984 the discharger proposed to prevent further migration of pollutants by means of ground-

water extraction and treatment, while continuing to monitor the pollutant plume and further refining the limits of pollution.

6. In January 1985 the suspect underground tanks were removed, and approximately 60 cubic yards of soils surrounding the tanks were excavated to a depth of 17 feet. The excavation was converted to a collection sump, and two additional wells were installed to control and clean up groundwater pollution by extraction pumping.

7. The waste stream consists of up to 52,000 gallons per day of polluted groundwater. The extracted groundwater is treated by air stripping prior to discharge to the storm drain system tributary to San Tomas Aquino Creek and South San Francisco Bay.

8. The Board adopted a revised Water Quality Control Plan for the San Francisco Bay Region (Basin Plan) on December 17, 1986. The Basin Plan contains water quality objectives and beneficial uses for South San Francisco Bay and contiguous surface waters, and groundwater.

9. The beneficial uses of surface water in the area, including water of South San Francisco Bay (South Bay) include:

   a. Contact and non-contact water recreation
   b. Wildlife habitat
   c. Preservation of rare and endangered species
   d. Estuarine habitat
   e. Warm fresh water and cold fresh water habitat
   f. Fish spawning and migration
   g. Industrial service supply
   h. Shellfish harvesting
   i. Navigation
   j. Ocean commercial and sport fishing

10. The Basin Plan prohibits discharges of wastewater which has particular characteristics of concern to beneficial uses (a) at any point in San Francisco Bay south of the Dumbarton Bridge and (b) at any point where the wastewater does not receive a minimum initial dilution of at least 10:1 or into any nontidal water, deadend slough, similar confined water, or any immediate tributary thereof.

11. The Basin Plan allows for exceptions to the prohibitions referred to in Finding 10 above when it can be demonstrated that a net environmental benefit can be derived as a result of the discharge.

12. Exceptions to the prohibitions referred to are warranted because the discharge is an integral part of a program to

clean up polluted groundwater and thereby produces a net environmental benefit, and because receiving water concentrations are expected to be below levels that would affect beneficial uses.

13. The Basin Plan prohibits discharges of all conservative toxic and deleterious substances, above those levels which can be achieved by a program acceptable to the Board, to waters of the Basin. The discharger's groundwater extraction and treatment system and associated operation, maintenance, and monitoring plan constitutes a presently acceptable control program for minimizing the discharge of toxicants to waters of the State.

14. The site identified herein is on the National Priority List (NPL). The Board is the lead State agency under the Multi Site Cooperative Agreement (MSCA) and is responsible for directing and coordinating remedial activities to satisfy the requirements under the Superfund Amendments and Reauthorization Act (SARA) and the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).

15. The Board has determined that (1) the effluent limitations in Order No. 85-70 are not wholly appropriate and that limits should be specified for individual organic constituents in the treated groundwater; (2) the "Standard Provisions, Reporting Requirements and Definitions" of 1977 should be replaced with a newer edition (December 1986); (3) the Part A of the Self-Monitoring Program, dated January 1978, should be replaced with a more recent edition (January 1987); and (4) miscellaneous corrections and/or changes in the Part B of the Self-Monitoring Program are warranted.

16. Effluent limitations of this revised Order are based on the Basin Plan, State and U. S. Environmental Protection Agency (EPA) Plans and Policies, and best technical judgement. EPA Region IX draft guidance "NPDES Permit Limitations for Discharge of Contaminated Groundwater: Guidance Document" was also considered in the determination of effluent limits.

17. The issuance of waste discharge requirements for this discharge is exempt from the provisions of Chapter 3 (commencing with Section 21100) of Division 13 of the Public Resources Code (CEQA) pursuant to Section 13389 of the California Water Code.

18. The Board has notified the discharger and interested agencies and persons of its intent to issue a revised Order for the discharge and has provided them with an opportunity for a public hearing and an opportunity to submit written views and recommendations.

19. The Board, in a public meeting, heard and considered all comments pertaining to the revised Order.

IT IS HEREBY ORDERED that the discharger, in order to meet the provisions contained in Division 7 of the California Water Code and regulations adopted thereunder, and the provisions of the Clean Water Act and regulations and guidelines adopted thereunder, shall comply with the following:

A. EFFLUENT LIMITATIONS

1. The discharge of waste containing constituents in excess of the following limits is prohibited:

Constituent	Instantaneous Maximum(ug/l)
chloroform	5
1,1-dichloroethane(1,1-DCA)	5
1,2-dichloroethane(1,2-DCA)	1
1,1-dichloroethylene(1,1-DCE)	5
1,2-dichloroethylene(1,2-DCE)	5
cis-1,2-dichloroethylene(c-1,2-D)	5
trans-1,2-dichloroethylene(t-1,2-D)	5
1,2-dichloropropane(1,2-DCP)	5
methylene chloride	5
tetrachloroethylene(PCE)	4
1,1,1-trichloroethane(1,1,1-TCA)	5
1,1,2-trichloroethane(1,1,2-TCA)	5
trichloroethylene(TCE)	5
acetone	50
vinyl chloride	2
trichlorotrifluoroethane(Freon 113)	5
trichlorofluoromethane(Freon 11)	5
dichlorotrifluoroethane	5
Total concentration of all volatile organic chemicals (VOCs) excluding acetone	100*

*100 micrograms per liter (ug/l) is equivalent to 0.100 milligrams per liter (mg/l)

2. The pH of the discharge shall not exceed 8.5 nor be less than 6.5 units.

3. In any representative set of samples, the discharge of waste shall meet the following limit of quality:

TOXICITY:

The survival of rainbow trout test fishes in 96-hour bioassays of the effluent as discharged shall be a median of 90% survival and a 90 percentile value of not less than 70% survival.

B. RECEIVING WATER LIMITATIONS

1. The discharge of wastes shall not cause the following conditions to exist in waters of the State at any place:

   a. Floating, suspended, or deposited macroscopic particulate matter or foam;

   b. Bottom deposits or aquatic growths;

   c. Alteration of temperature, turbidity, or apparent color beyond present natural background levels;

   d. Visible, floating, suspended, or deposited oil or other products of petroleum origin;

   e. Toxic or other deleterious substances to be present in concentrations or quantities which will cause deleterious effects on aquatic biota, wildlife, or waterfowl, or which render any of these unfit for human consumption either at levels created in the receiving waters or as a result of biological concentration.

2. The discharge of waste shall not cause the following limits to be exceeded in waters of the State in any place within one foot of the water surface:

a.	Dissolved oxygen:	5.0 mg/l minimum. The median dissolved oxygen concentration for any three consecutive months shall not be less than 80% of the dissolved oxygen content at saturation.
b.	pH:	The pH shall not be depressed below 6.5 nor raised above 8.5, nor caused to vary from normal ambient pH levels by more than 0.5 units.
c.	Un-ionized ammonia (as N)	0.025 mg/l annual mean 0.4 mg/l maximum at any time

3. The discharger shall not cause a violation of any

applicable water quality standard for receiving waters adopted by the Board or the State Water Resources Control Board as required by the Federal Water Pollution Control Act and regulations adopted thereunder. If more stringent applicable water quality standards are promulgated or approved pursuant to Section 303 of the Federal Water Pollution Control Act or amendments thereto, the Board will revise and modify this Order in accordance with such more stringent standards.

C. PROVISIONS

1. The discharger shall comply with all sections of this Order immediately upon adoption by the Board.

2. The discharger shall comply with the Self-Monitoring Program as adopted by the Board and as may be amended by the Executive Officer.

3. This Order includes all items of the attached "Standard Provisions, Reporting Requirements and Definitions" dated December 1986 except A.10, B.2, B.3, C.8, C.11.

4. Any noncompliance with a requirement of this Order shall be reported as stated in Section C.10 of the "Standard Provisions, Reporting Requirements and Definitions" referred to in C.3. above.

5. This Order authorizes only the discharge of treated extracted ground water to a storm sewer on the site at 3050 Bowers Avenue in Santa Clara, which is tributary to San Tomas Aquino Creek, and only as provided herein.

6. The maximum combined pumping rate of all extraction wells shall not exceed 30 gallons per minute (gpm) without prior approval of the Board's Executive Officer.

7. This Order expires June 19, 1990. The discharger must file a report of waste discharge in accordance with Title 23, Chapter 3, Subchapter 9 of the California Administrative Code not later than 180 days in advance of such expiration date as application for issuance of new waste discharge requirements.

8. This Order shall serve as a National Pollutant Discharge Elimination System Permit pursuant to Section 402 of the Clean Water Act or amendments thereto, and shall become effective ten (10) days after the date of its adoption provided the Regional Administrator, Environmental Protection Agency, has no objection. If the Regional Administrator objects to its issuance, the permit shall not become effective until such objection is withdrawn.

9. Order No. 85-70 is hereby rescinded.

I, Steven R. Ritchie, Executive Officer, do hereby certify that the foregoing is a full, true and correct copy of an Order adopted by the California Regional Water Quality Control Board, San Francisco Bay Region, on December 21, 1988.

STEVEN R. RITCHIE
Executive Officer

Attachments
Standard Provisions,Reporting Requirements and Definitions, December 1986 (modified January, 1987)

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION

SELF-MONITORING PROGRAM

FOR

APPLIED MATERIALS, INC.
3050 BOWERS AVENUE FACILITY
CITY OF SANTA CLARA
SANTA CLARA COUNTY

NPDES NO. CA0028851

ORDER NO. 88-171

CONSISTS OF

PART A, dated December 1986
modified January 1987

and

PART B

PART B

I. DESCRIPTION OF SAMPLING STATIONS

A. INFLUENT

Station	Description
I-1	At a point in the groundwater extraction/treatment system immediately prior to treatment.

B. EFFLUENT

Station	Description
E-1	At a point in the groundwater extraction/treatment system immediately following treatment.

C. RECEIVING WATERS

Station	Description
C-1	At a point in San Tomas Aquino Creek 300 feet but not more than 600 feet downstream from the discharge point.

II. SCHEDULE OF SAMPLING AND ANALYSIS

A. The schedule of sampling and analysis shall be that as shown in Table I attached.

III. MODIFICATION OF PART A, DATED JANUARY 1987

All items of Self-Monitoring Program Part A, dated December 1986 and as modified January 1987 shall be complied with except for the following:

A. Additions to Part A: Section G.4.d.5: "In the twice annual open-scan for effluent samples, all chromatic peaks for purgeable halocarbons and/or volatile organics shall be identified and quantified. If previously unquantified peaks are identified in any sample, these peaks shall be confirmed within four weeks or at the next sampling event based on analyses of samples using chemical standards necessary to achieve proper identification and quantification.

"Results from each required analysis and observation,

including any confirmatory analysis, shall be submitted as laboratory originated data summary sheets in the monthly self-monitoring reports. Results shall also be submitted for any additional analyses performed by the discharger at the specific request of the Board for parameters for which effluent limits have been established and provided to the discharger by the Board, and shall be submitted with the report for the month in which the analysis was made."

B. Deletions from Part A: Sections D.2.b., D.2.g., D.3.b.,E.1.e.1., E.1.f., E.2.b., E.3., E.4., E.5.,F.2.b.,G.2, G.4.b., G.4.e., G.4.f.

C. Modifications to Part A: for the following, the discharger shall comply with the Sections as changed and reported herein.

1. Section D.2.a. is changed to read:

   Samples of effluent and receiving waters shall be collected at times coincident with influent sampling unless otherwise stipulated. The Regional Board or Executive Officer may approve an alternative sampling plan if it is demonstrated that expected operating conditions warrant a deviation from the standard sampling plan.

2. Section D.2.d. is changed to read:

   If two consecutive samples of any one constituent or parameter monitored on a weekly or monthly basis in a 30-day period exceed the effluent limit or are otherwise out of compliance, or if the required sampling frequency is once per month or less (quarterly, annually or other) and the sample or parameter exceeds the limit or is otherwise out of compliance, the discharger shall implement procedure(s) acceptable to or approved by the Board Executive Officer, on a case by case basis.

3. Section D.2.e. is changed to read:

   If any instantaneous maximum limit is exceeded, the discharge shall terminate immediately upon discovery of the excess, and shall not resume until the cause of the violation is found and corrected and/or the Board Executive Officer authorizes resumption of the discharge.

4. In Section F.1, the phrase "(at the waste treatment plant)" is changed to read, "(at the discharger's

facility at 3050 Bowers Avenue in Santa Clara)".

5. Information requested in Section G.4.e. shall be prepared in a format similar to EPA form 3320-1 and submitted only to the Regional Board.

6. The Annual Report required in Section G.5. shall be submitted in place of the end of the year monthly report.

7. The GC/MS scan required twice annually at E-1 shall be substituted for the monthly organic chemical analysis at this sampling station during the months when the GC/MS scan samples are collected.

IV. MISCELLANEOUS REPORTING

A. If any chemicals or additives are proposed to be used in the operation and/or maintenance of the extraction/treatment system, the discharger shall obtain the Board's concurrence prior to use. The details concerning such approved use shall be reported in the next periodic report submitted to the Board.

I, Steven R. Ritchie, Executive Officer, hereby certify that the foregoing Self-Monitoring Program:

1. Has been developed in accordance with the procedures set forth in this Regional Board's Resolution No. 73-16 in order to obtain data and document compliance with waste discharge requirements established in Regional Board Order No. 88-171.

2. Was adopted by the Board on December 21, 1988.

3. May be reviewed at any time subsequent to the effective date upon written notice from the Executive Officer or request from the discharger, and revisions will be ordered by the Executive Officer or Regional Board.

STEVEN R. RITCHIE
Executive Officer

Attachment: Table I

TABLE I
SCHEDULE FOR SAMPLING, MEASUREMENTS, AND ANALYSIS

Sampling Station	I-1	E-1	C-1
TYPE OF SAMPLE	G	G	G
Flow rate (mgd)	D		
Total Suspended Matter (mg/l & kg/day)		Q	
Fish Tox'y 96-hr. % Surv'l in undiluted waste		Y	
Ammonia Nitrogen (mg/l & kg/day) {1}			
pH (units)	M	M	2/Y
Dissolved Oxygen (mg/l & Saturation)		2/Y	2/Y
Temperature (Centigrade)		Q	Q
Metals (Standard Methods For Priority Pollutants)		Y	
Identifiable Organic Chemicals {2}	M	M	2/Y
GC/MS Open Scan (EPA Method 624/625)		2/Y	

LEGEND FOR TABLE I

Type of Station

I = intake and/or water supply station
E = waste effluent station
C = receiving water station

Type of Sample

G = grab sample

Frequency of Sampling

D = once each day
M = once each month
Y = once each year
2/Y = once in March and once in September
Q = quarterly, once in March, June, September, and December

REMARKS FOR TABLE I

(1) Total ammonia nitrogen shall be analyzed and un-ionized ammonia calculated whenever fish bioassay test results fail to meet the specified percent survival.

(2) Identifiable Organic Chemicals refers to volatile organic compounds and associated organic constituents and compounds, whether identified as chlorinated, halogenated, or otherwise, and include but are not limited to the following:

chloroform
1,1-dichloroethane
1,2-dichloroethane
1,1-dichloroethylene
1,2-dichloroethylene
cis-1,2-dichloroethylene
trans-1,2-dichloroethylene
1,2-dichloropropane
methylene chloride
tetrachloroethylene
1,1,1-trichloroethane
1,1,2-trichloroethane
trichloroethylene
acetone
vinyl chloride
trichlorotrifluoroethane
trichlorofluoromethane
dichlorotrifluoroethane

Any other organic constituents identified during or as a result of required analyses, and concentrations detected, shall be reported.

Concentrations detected may be reported in micrograms per liter (ug/l) or parts per billion (ppb), or in other commonly acceptable units of measurement. The unit of measurement will be clearly provided with the analysis.